



Federal Ministry
for Economic Affairs
and Energy



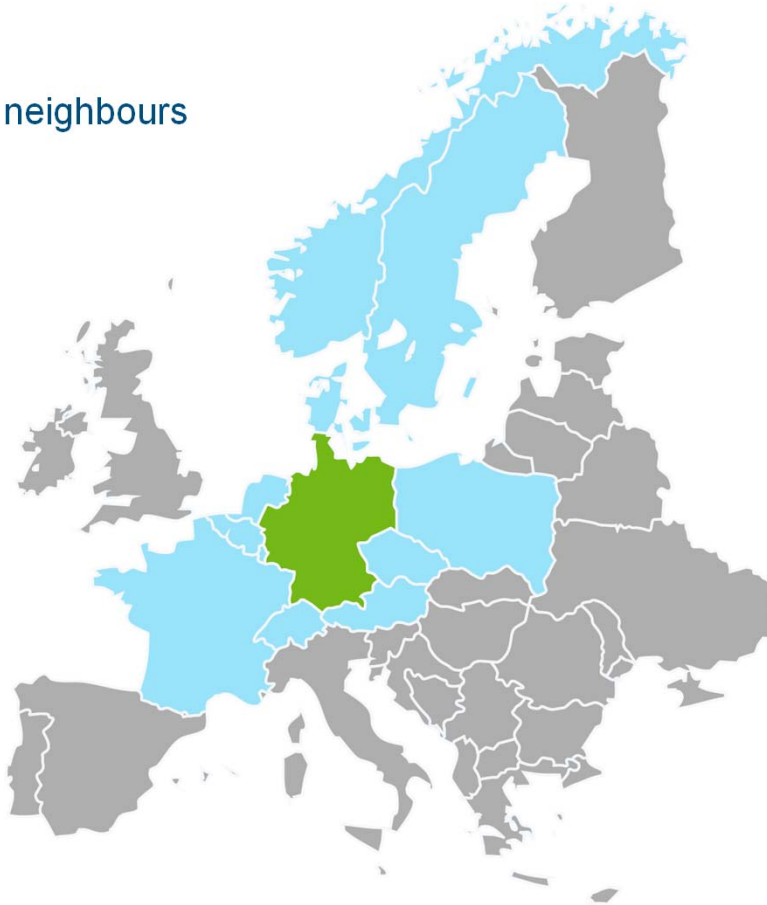
Germany's *Energiewende*

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Germany is in a unique position to drive the transformation of the energy system in Europe

■ Electrical neighbours



Germany at a glance

- Population: 82 million
- Largest economy in Europe, 4th largest in the world
- Gross electricity production 2016: 648,4 TWh
- Primary energy consumption 2016: 13.383 PJ

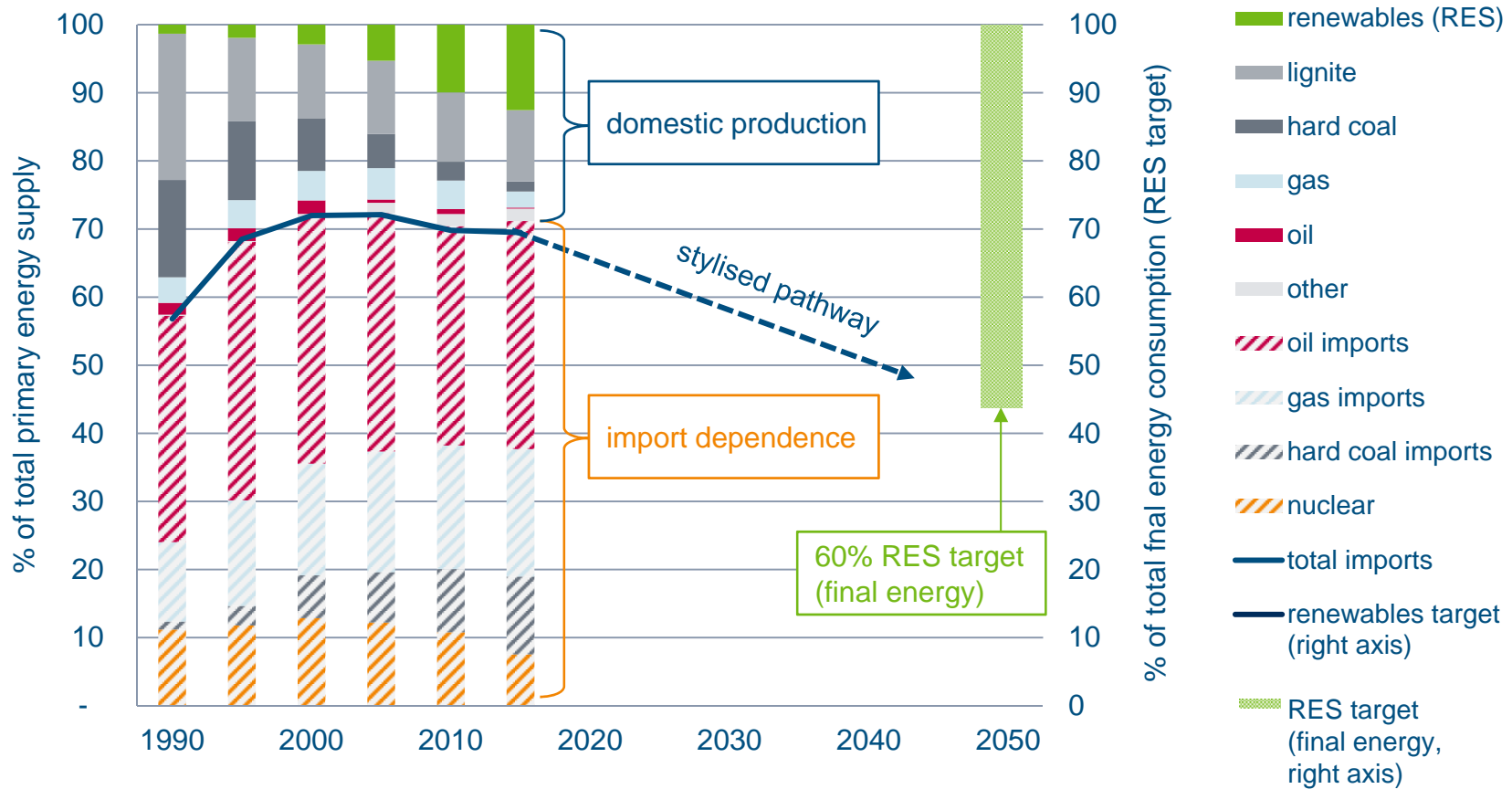
Source: BMWi, 2015, AGEBA 2017, Statista 2017

Five reasons for the *Energiewende*

- Reduce dependency on energy imports
- Innovation for growth and employment: new technologies, new business models, digitization
- Phase-out nuclear power generation
- Reduce carbon emissions and reach climate protection targets
- Energy transition can be both sustainable and economically successful



Renewables reduce energy import dependence



Source: Ecofys 2017 based on AGEb 2012, AGEb 2014

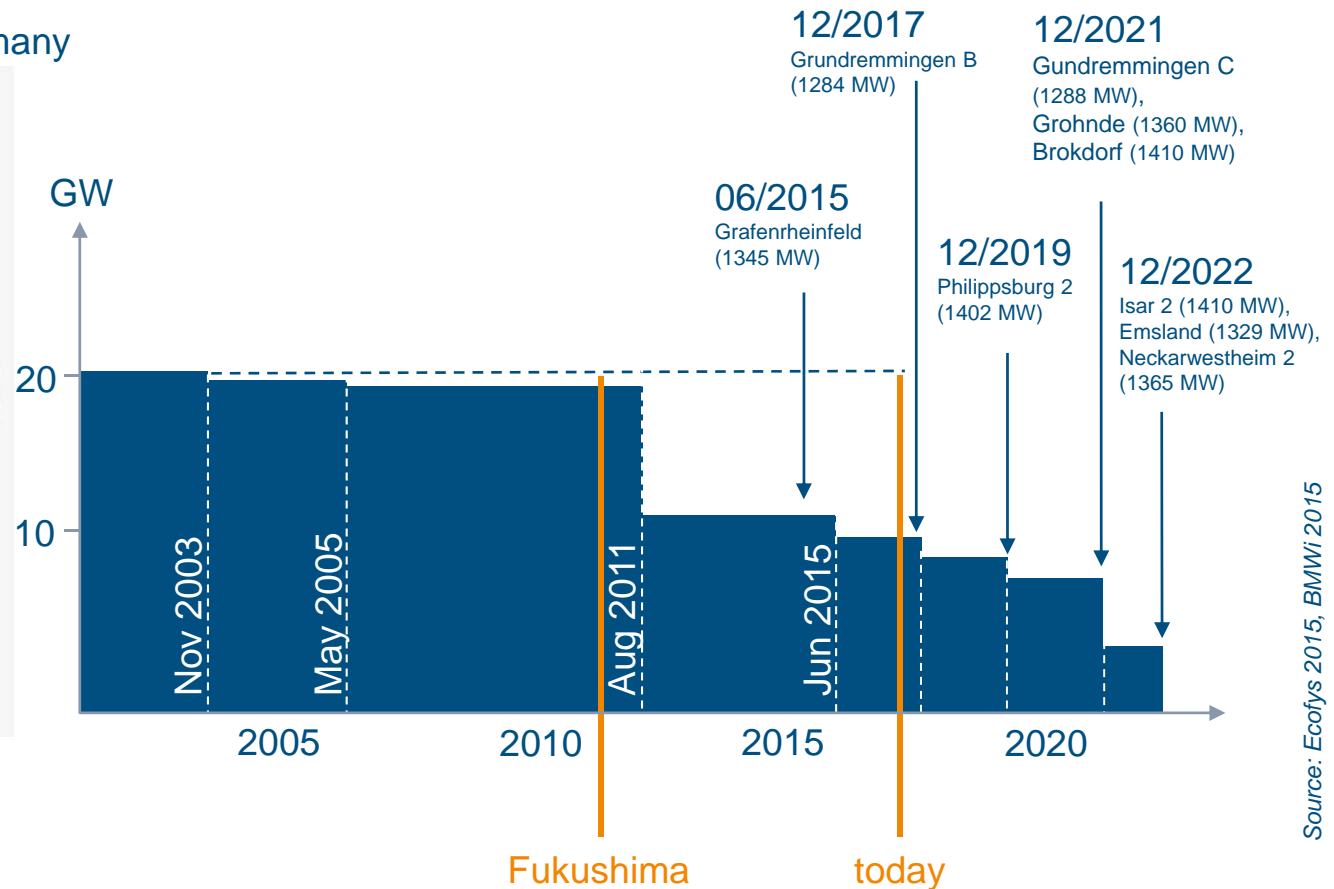
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Germany is gradually phasing out nuclear power until 2022

Nuclear power plants in Germany



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The energy transition triad combines efficiency, direct use of renewables and sector coupling

Efficiency first



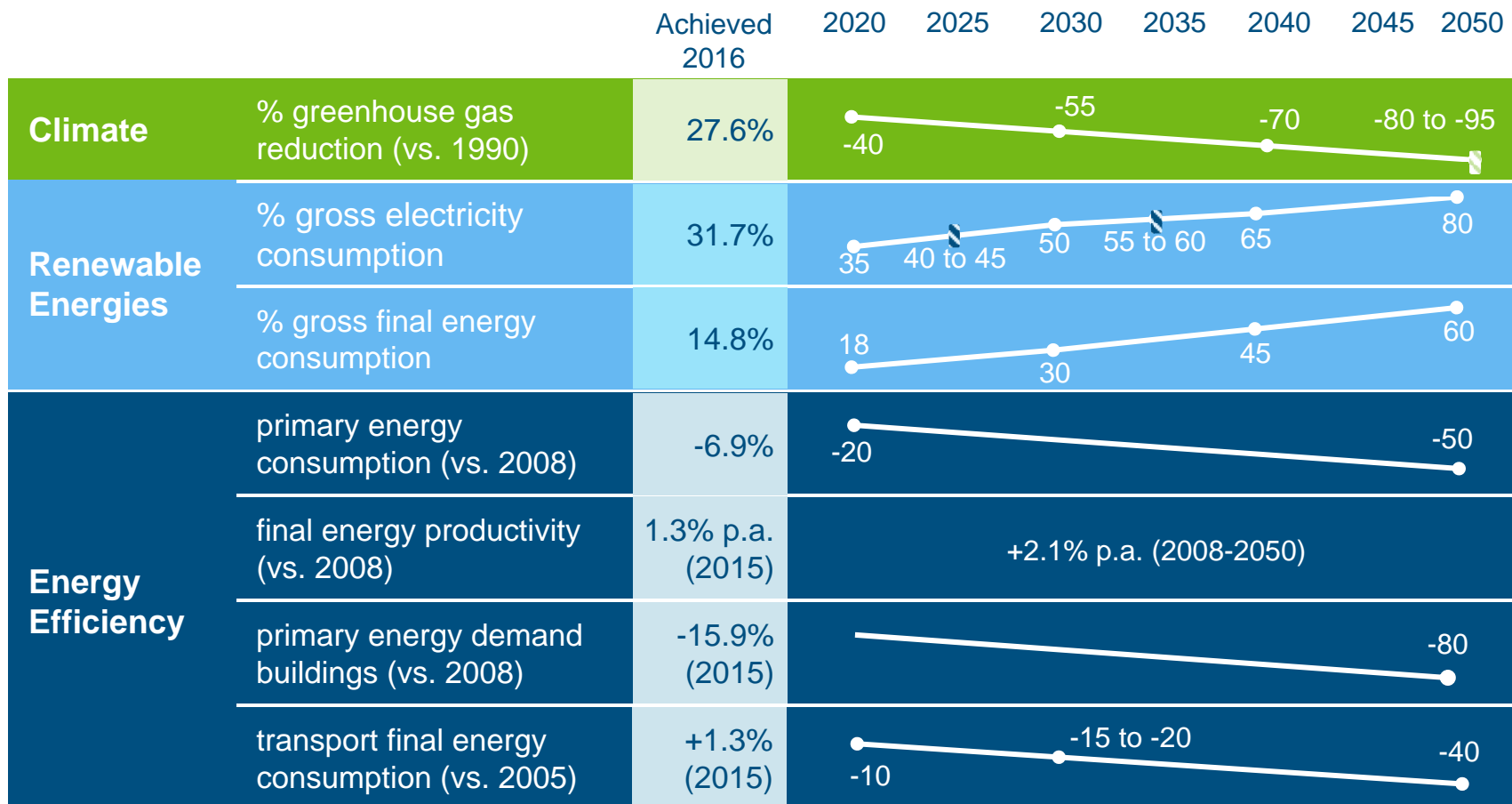
Direct use of renewables



Sector coupling

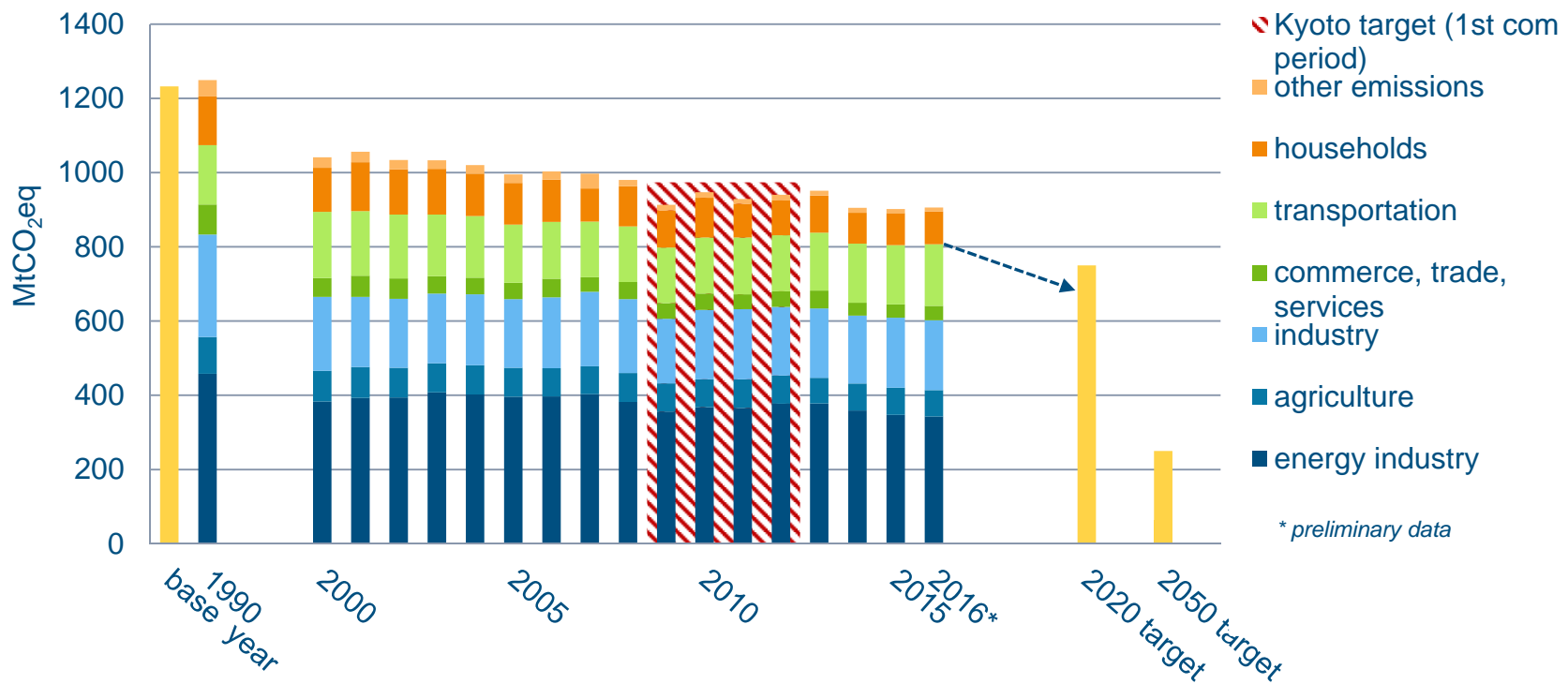


The *Energiewende* represents the long-term energy and climate strategy of Germany



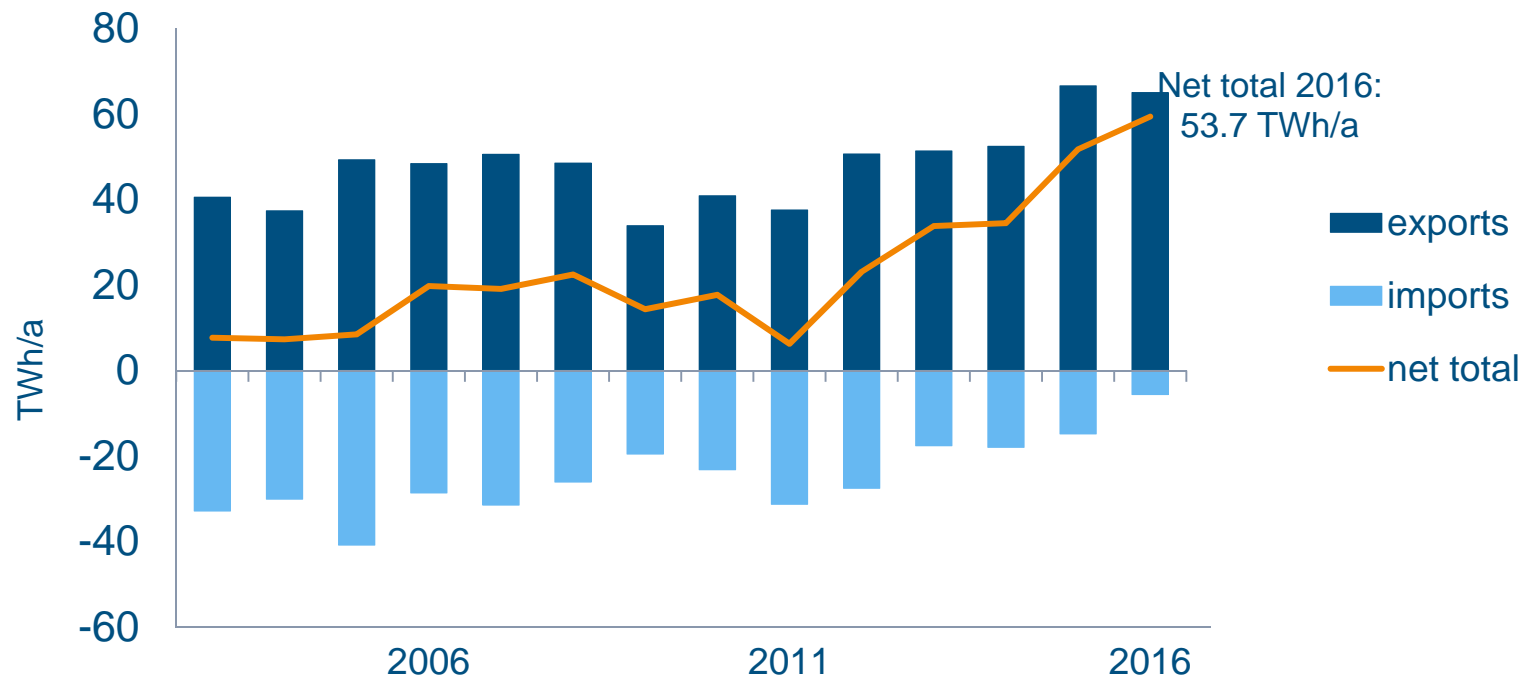
Source: BMWi 2016, UBA 2017

Germany has made significant progress. But more action needed to achieve 40% emission reduction by 2020



Source: UBA 2017

Germany has been a net electricity exporter for more than 10 years

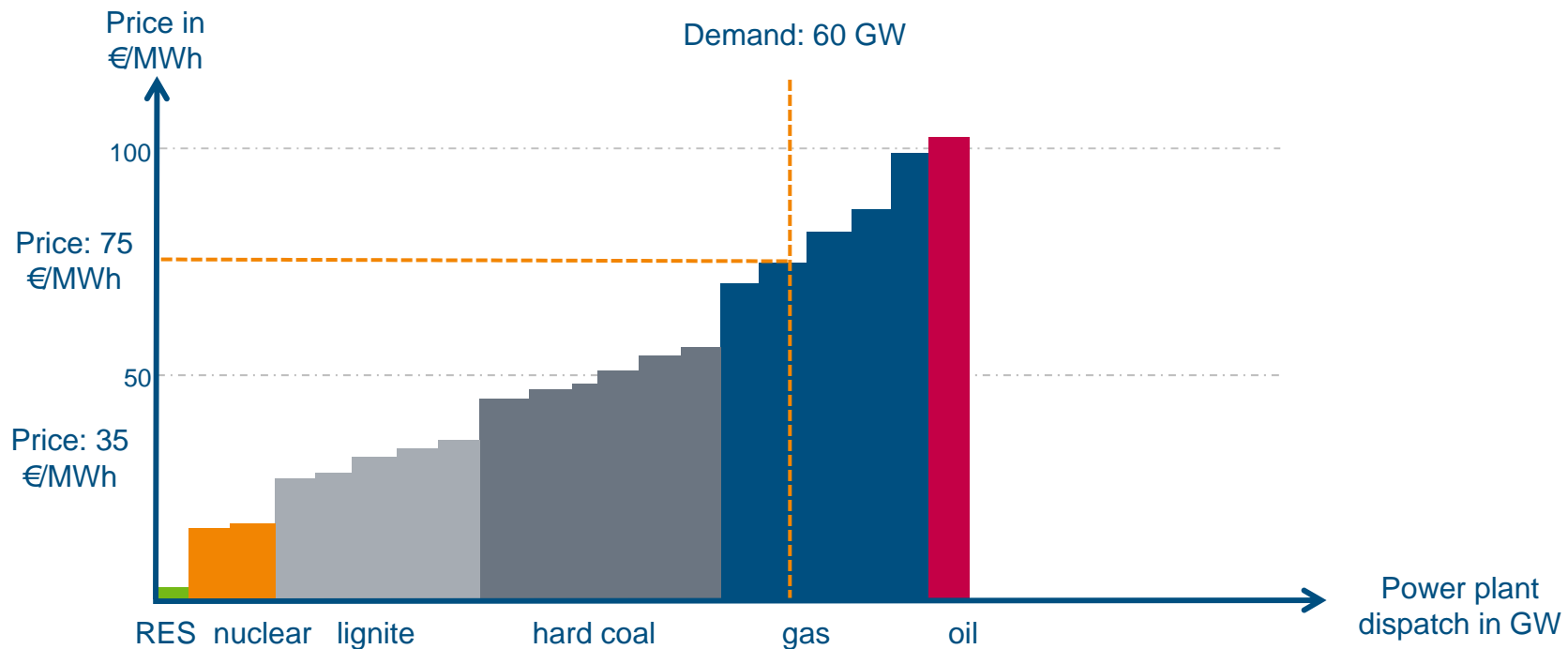


Germany's import and export balance of physical load flows

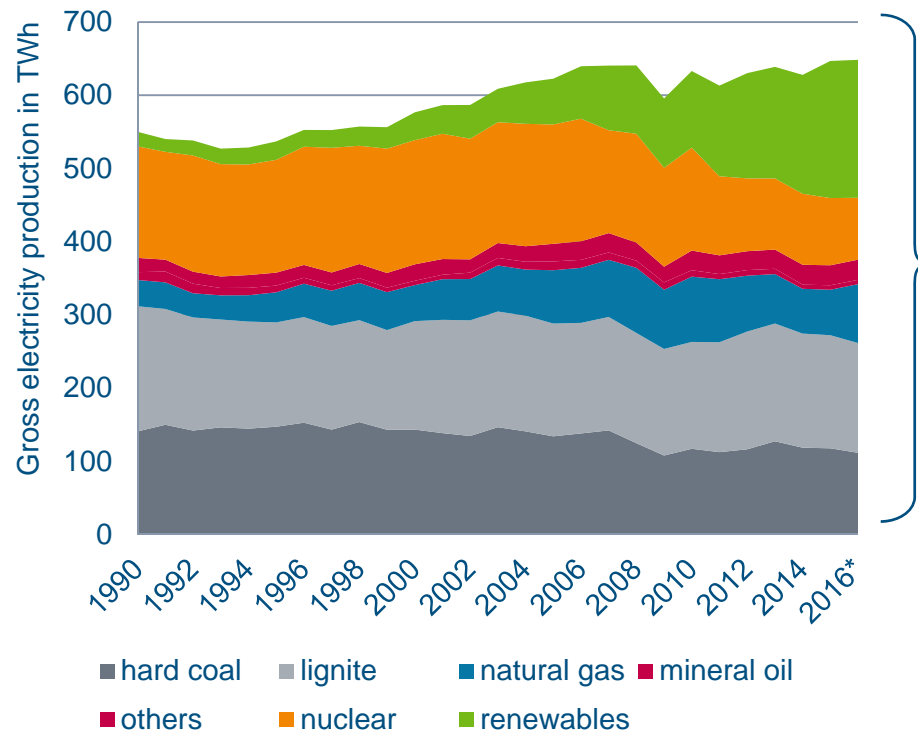
Source: Ecofys based on ENTSO-E 2017

Renewables shift the merit order and lower price levels on the wholesale market

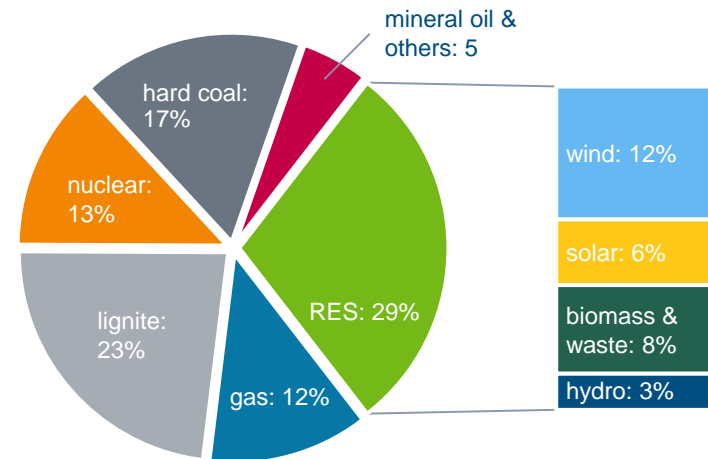
Merit order (stylised)



Renewables have become Germany's No. 1 source of electricity

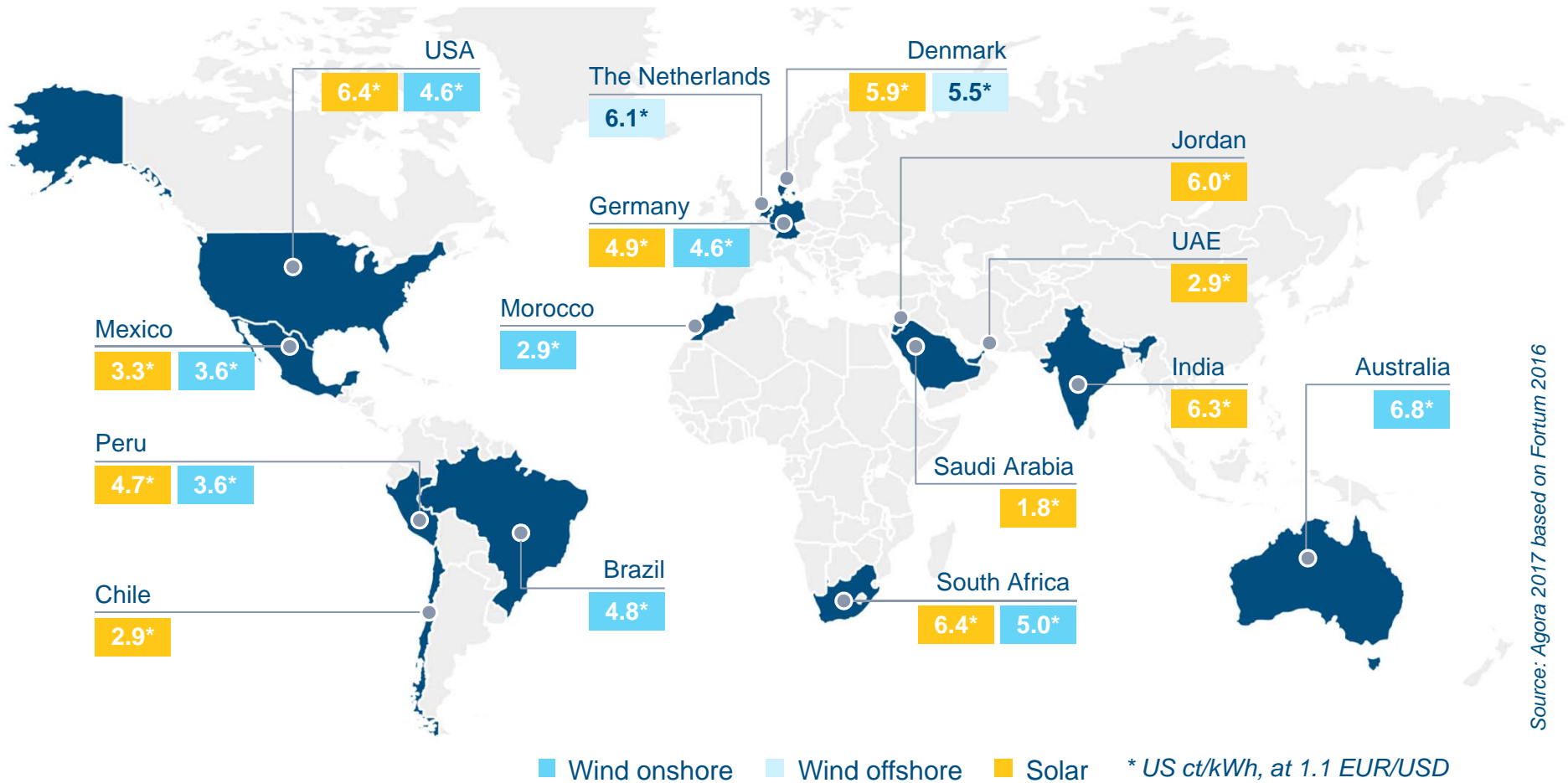


Electricity mix in 2016
(648.4 TWh in total)



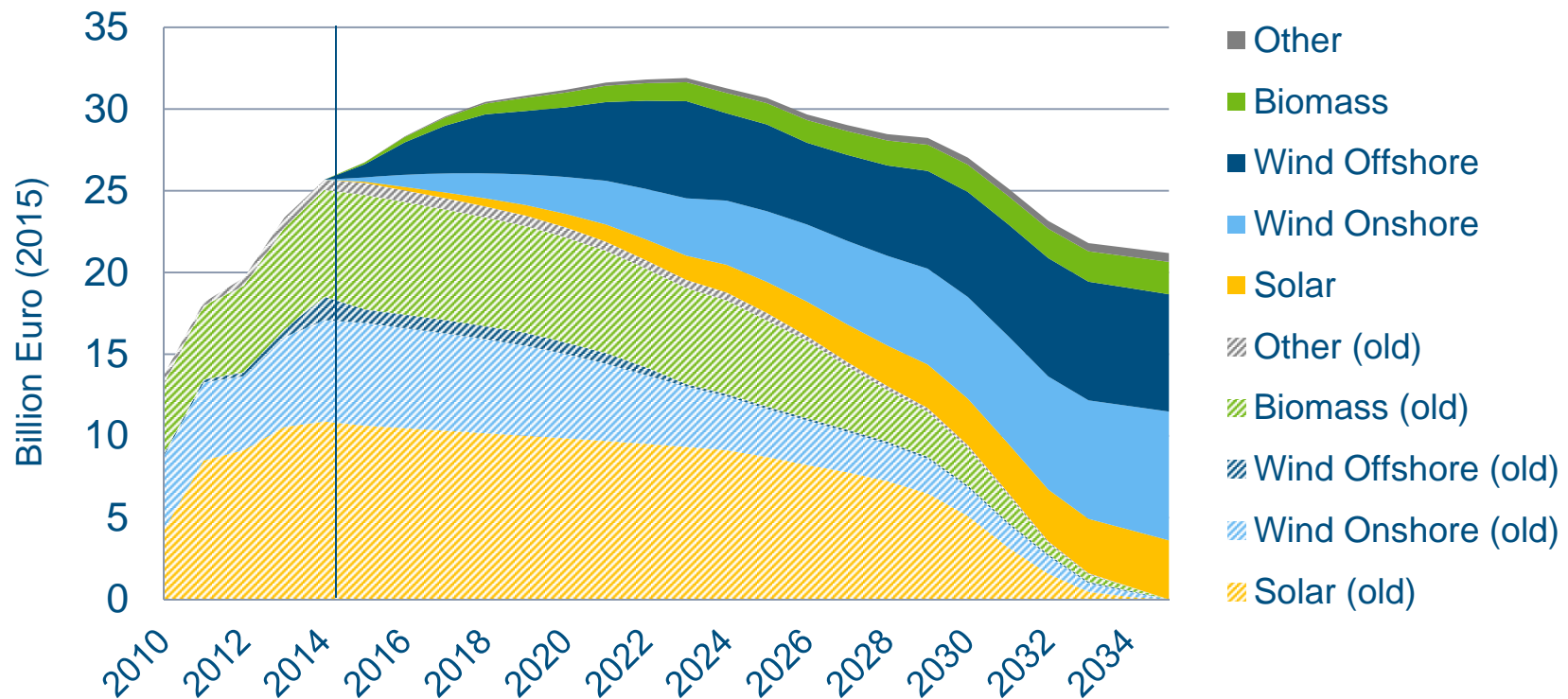
* preliminary data
rounded figures

Auction results worldwide highlight rapidly declining costs for renewables



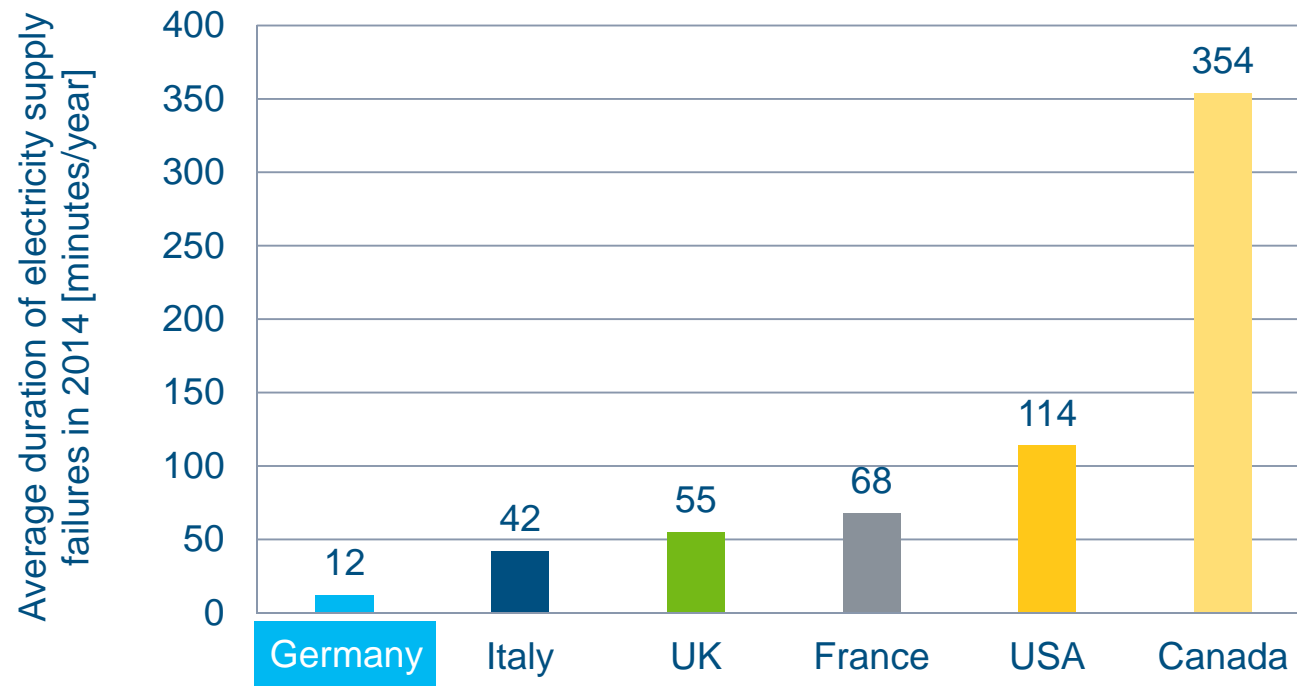
Source: Agora 2017 based on Fortum 2016

German RES support payments mainly go to existing plants. New installations account for a much smaller share.



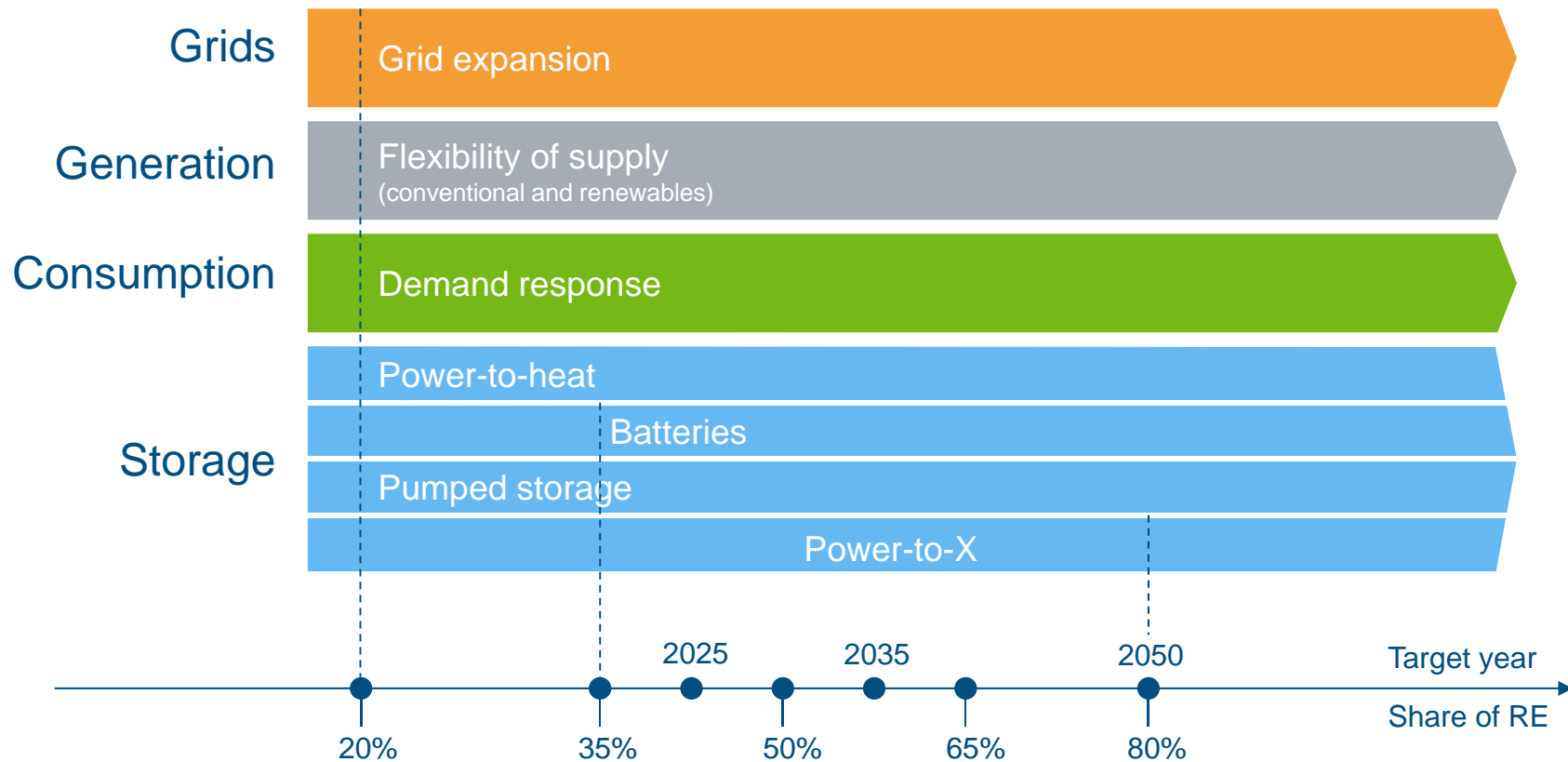
Source: Ecofys 2015, based on Agora Energiewende/ Öko-Institut 201

Germany's security of electricity supply remains one of the highest worldwide



Source: VDE 2015, CEER 2015; EIA 2014; Canadian Electricity Association 2014 based on SAIDI index, excluding exceptional events Data from 2013 and 2014 according to availability

Flexibility options are key to making the system renewables-ready



Source: Ecofys 2016

The Electricity Market Act sets up the power market for increased shares of variable renewables

More flexibility

Free price information

- Strengthened market mechanisms
- No price caps

Strengthen balancing group rules

- Strengthen incentives/commitments
- Responsible parties bear cost

Removing market barriers for flexibility

- Access balancing capacity markets
- More competition

Ensure system security

Monitoring of security of supply

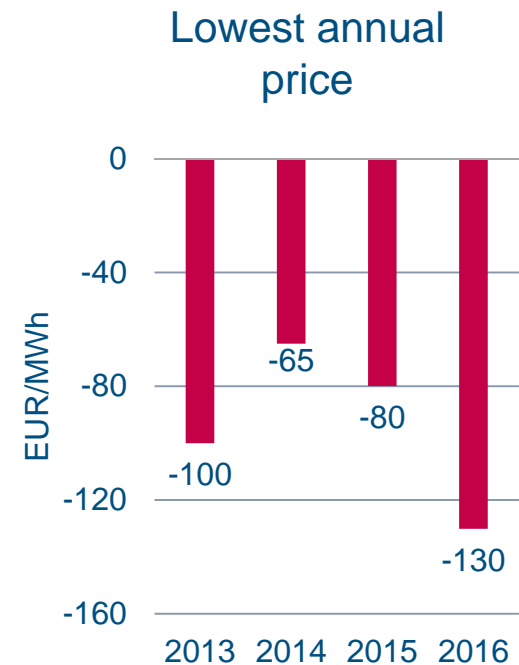
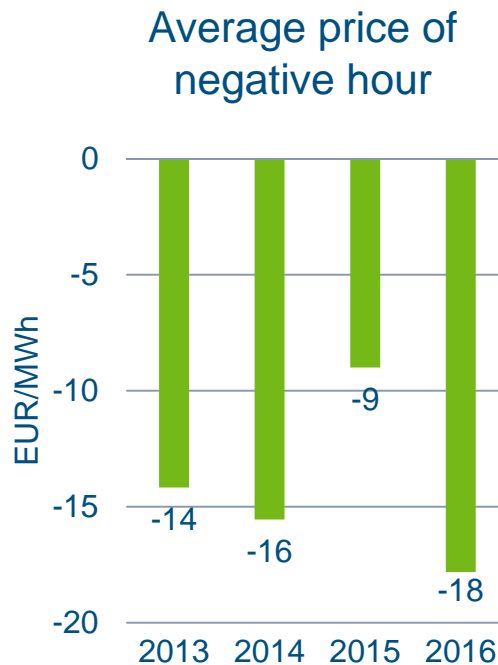
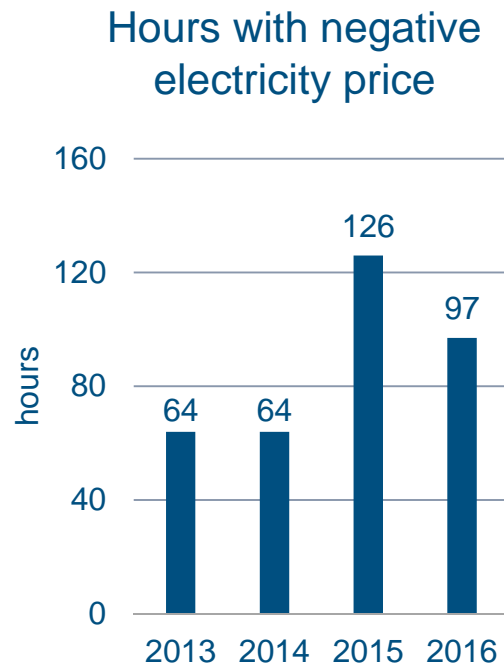
- Both nationally and on EU level

Capacity reserve as “emergency back-up”

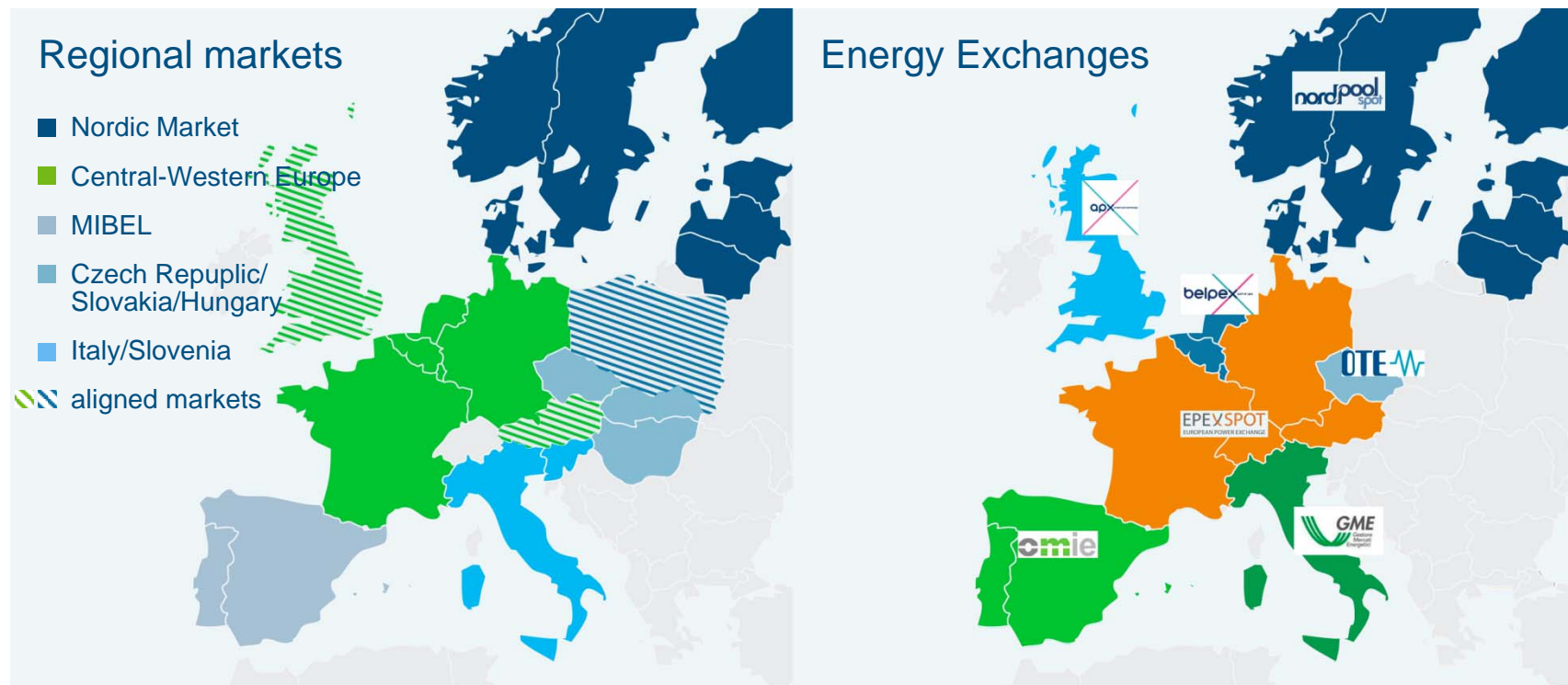
- “Stand by” outside of market – operated at last resort
- “No way back” – no market distortion

Source: BMWi 2017

Declining hours of negative prices show that the system starts to adapt, but more flexibility is needed



Market coupling is an essential approach towards establishing an EU internal electricity market



Source: REE 2012, ACER 2012



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Thank you for your attention!

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